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14. ABSTRACT Successfully transitioning from a war on drugs to a war on terrorism in Colombia is a national security concern for the United States and poses significant operational readiness challenges for USSOUTHCOM. The enemy is well funded and growing in capability. Drug trafficking, arms purchases and distribution of cocaine continue, as does the terror threat to US interests and its citizens. The pursuit of operations of mutual interest to nations of the region will require intelligence information interoperability among forces and allies. To successfully assist the current Colombian government and others in defeating this narco-terrorist threat, a range of intelligence is needed. This information should be timely, detailed and sharable with both Colombia and its neighbors. Today, intelligence gaps are a direct result of a lack of this type information and as a result, intelligence used to formulate operational planning assumptions in the Colombian area is grossly inadequate. Geospatial intelligence can be used to help mitigate the current intelligence gaps associated with our lack of knowledge about narco-terrorist groups in Colombia and, providing the foundation from which intelligence and other operational readiness challenges can be mitigated, will be a key force multiplier. Commercial satellite imagery is a way to meet objectives of more, timely, and current geospatial intelligence. This intelligence information will enable a situational awareness of the battlefield environment previously unknown to the USSOUTHCOM joint commander and can be provided in an unclassified venue when required for sharing between coalition partners.					
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**MITIGATING KEY INTELLIGENCE GAPS IN THE COLOMBIAN WAR ON
TERRORISM**

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A paper submitted to the Faculty of the Naval War College in
partial satisfaction of the requirements of the Department of
Joint Military Operations.

**The contents of this paper reflect my own personal views and are not necessarily endorsed
by the Naval War College of the Department of the Navy.**

Signature:_____

16 May 2003

ABSTRACT

Successfully transitioning from a war on drugs to a war on terrorism in Colombia is a national security concern for the United States and poses significant operational readiness challenges for USSOUTHCOM. The enemy is well funded and growing in capability. Drug trafficking, arms purchases, and distribution of cocaine continue, as does the terror threat to U.S. interests and its citizens. The pursuit of operations of mutual interest to nations of the region will require intelligence information interoperability among forces and allies.

To successfully assist the current Colombian government and others in defeating this narco-terrorist threat, a range of intelligence is needed. This information should be timely, detailed and sharable with both Colombia and its neighbors. Today, intelligence gaps are a direct result of a lack of this type information and as a result, intelligence used to formulate operational planning assumptions in the Colombian area is grossly inadequate.

Geospatial intelligence can be used to help mitigate the current intelligence gaps associated with our lack of knowledge about narco-terrorist groups in Colombia and, providing the foundation from which intelligence and other operational readiness challenges can be mitigated, will be a key force multiplier. Commercial satellite imagery is a way to meet objectives of more, timely, and current geospatial intelligence. This intelligence information will enable a situational awareness of the battlefield environment previously unknown to the USSOUTHCOM joint commander and can be provided in an unclassified venue when required for sharing between coalition partners.

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Recently, troops conducting operations in a heavy jungle environment were using road-signs to navigate their way. Unbeknownst to them, guerrilla insurgents switched the signs drawing them into an ambush. “How did we get in the middle of this hostile environment?” Quipped the young infantryman under fire... “I guess we should have trusted the map”...

Accurate geospatial intelligence of cultural and terrain information as well as enemy troop capability and location is the key to successful force mobility and operations.

We must provide the ubiquitous knowledge map necessary to provide complete situational awareness whatever and wherever the situation.

James R. Clapper Jr., Lt. Gen., USAF (Ret), NIMA Director

Introduction:

Successfully transitioning from a war on drugs to a war on terrorism in Colombia is a national security concern for the United States and poses significant operational readiness challenges for USSOUTHCOM.

Colombia is in serious danger of becoming a narco-terrorist state with direct and clandestine routes into the United States homeland. Though increased financial aid and military support are being provided to the region in an attempt to stop the terror threat, operational success is largely dependent on engaging Colombia's neighbors as coalition partners to confine the spread of the danger created by the terrorists. But creating a coalition is not enough. Both the U.S. military and its coalition partners suffer an intelligence gap; a lack of information that identifies terrorist actions and analyzes their intent. This intelligence is necessary for situational awareness and for synchronizing and integrating operations across all elements of authority in the coalition.

To successfully assist the current Colombian government and others in defeating this narco-terrorist threat, a range of intelligence is needed. This information should be timely, detailed and sharable with both Colombia and its neighbors. Today's intelligence gaps are a

direct result of a lack of this type information and as a result, intelligence used to formulate operational planning assumptions in the Colombian area is grossly inadequate.

Geospatial intelligence can be used to help mitigate the intelligence gaps associated with our lack of knowledge about narco-terrorist groups in Colombia and, providing the foundation from which intelligence and other operational readiness challenges can be mitigated, will be a key force multiplier .

This paper will identify where intelligence information gaps exist and examine how they can be mitigated through the use of geospatial intelligence. Information sharing problems will also be identified along with recommendations for how they can be alleviated through the expanded use of commercial satellite imagery.

Background: Colombia, Drugs, Terrorism and US Interests.

Colombia has been embroiled in a quagmire of civil disorder since the late 1940s, which over time has taken hundreds of thousands of lives. The violence continues today. Terrorist groups¹ are fighting one another and the government to control the security of Colombia. Some eighty percent of the cocaine consumed in the US and Europe comes from Colombia.²

Terrorist organizations in Colombia have recognized the tremendous economic opportunity the drug trade provides and have injected themselves into the trade as primary players.³ These terrorist organizations use the profits made from the illegal drug trade to buy arms and as a

¹ The three terrorist groups of primary concern to the Joint Commander of USSOUTHCOM are: The FARC (Fuerzas Armadas Revolucionarias Colombianas), a Spanish acronym for the Revolutionary Armed Forces of Colombia, which boasts 18,000 members principally engaged in drug-financed, left wing insurgency operations. The other group on the left is somewhat smaller in stature known by the name ELN (Ejercito de Liberacion Nacional), the National Liberation Army. They claim in the neighborhood of 5,000 guerrillas.

The AUC, a 12,000 body paramilitary group known by the name United Self Defense Groups of Colombia are characterized by their desire to control Colombia as a right wing, drug- financed, extreme nationalist entity.

² Julia E. Sweig, "What kind of War for Colombia?" *Foreign Affairs*, September/October 2002. http://web.lexis-nexis.com/universe/document?_m=b1cfd2e5fc4e7dc0c542dc744c3efl5e&_docnum=17.htm> , [13 April 2003].

result, profits from drug trafficking activity have dramatically strengthened the fighting capacity and capability of Colombia's terrorist groups.⁴ The additional arms in the hands of the terrorists threaten the authority and stability of the Colombian government and threaten US interests in the region (US citizens and oil). The flow of illegal arms promises to intensify terrorist violence and degenerate the overall security of Colombia and the nations of the region.

Terrorist organizations operating just to the south of our nation with drug trafficking tentacles reaching far into the interior of the US serve to exacerbate illegal drug use and as a result, pose a very significant threat to our national security. According to statements in the National Security Strategy (NSS) released in 2002, "In Colombia, we recognize the link between terrorist and extremist groups that challenge the security of the state and drug trafficking activities that help the operations of such groups."⁵ Profits from drug trafficking activities are also linked to purchases of weapons of mass destruction, especially in Colombia that have the potential to threaten the US homeland.⁶ Terrorist organizations in the region continue to take advantage of an economically and socially volatile environment to proliferate through illegal drug trade and arms trafficking.

The United States is presently providing nearly \$1.7 billion in American military aid directly to the war on terrorism in Colombia.⁷ U.S. foreign aid to Colombia is intended to train the Colombian military to interdict terrorist illicit activities, improve the stability of Colombia's democratic government, promote economic prosperity and cut off the supply of drugs. Although

³ Christopher Lingle, "Will Latin America Experience Contagion like East Asia in 1977?" 12 August 2002. <http://www.hankooki.com> [13 April 2003].

⁴ Barry McCaffrey and John Basso, "Narcotics, Terrorism and International Crime: The Convergence Phenomenon." Original essay written for *Terrorism and Counter-Terrorism: Understanding the New Security Environment*. Howard and Sawyer, McGraw-Hill, 2002.

⁵ United States Executive Office of the President, *The National Security Strategy*. September 2002.

⁶ Juan Forero, "Shifting Colombia's Aid: US focuses on Rebels," *The New York Times*, Bogotá, Colombia. 10 August 2002. http://web.lexis-nexis.com/universe/document?_m=033972d11fd8c291433140ee467552bc&_docnum=60.htm, [13 April 2003].

the military aid programs are in place to eradicate drug crops through spraying, cultivate jobs for the “eradicated” farmers, foster a more stable economy and promote stability in the government ranks through the broadening of democratic ideals, it has become clear that the U.S. is moving beyond the war on drugs to embrace a war on terrorism in Colombia. Internal violence has escalated and the number of terrorist groups has increased. These groups are using illegal drug sale profits to train their members and to buy more arms and better arms, thus posing a very real threat to Colombia’s authority and stability.

. The issue of terrorism in South America doesn’t end with Colombia. Regrettably, the actions of terrorists run rampant throughout the entire region. Many areas eagerly provide safe haven for the terrorists. When discovered, the terrorist groups simply change location, moving from Colombia to other countries in the region. A concerted effort on the part of all nations in the region is needed to address the larger regional drug trafficking and terrorist problem.⁸

The challenge of interdicting illicit activities that support terrorists throughout the USSOUTHCOM Area of Responsibility (AOR) will require not only the authority to use United States financial and military assets but also the assistance of partner nations and the Organization of American States (OAS).⁹ Nations of the Andean Region (Venezuela, Ecuador, Peru and Bolivia) have resolved to address the terrorism problem together by controlling terrorist movements, freezing terrorist finances and supporting efforts to control arms trafficking.¹⁰

Drug trafficking and terrorism are not the only interests to the United States and USSOUTHCOM in the region. From an economic perspective, Colombia has the potential to

⁷ Juan Forero, Ibid, 2.

⁸ Juan Forero, Ibid, 3

⁹ Juan Forero, Ibid. 3.

¹⁰ Global News Wire, “Colombia, Neighbors, U.S to Coordinate Approach to Terrorism.” *EFE News Service*. 11 March 2003.

http://web.lexisnexis.com/universe/document?_m=976eaf9bef880cee73883e5845667ecc&docnum=9.htm , [9 April 19, 2003]. Pg.1.

become a primary oil supplier to the US in the future. Colombia is reported to possess an estimated 2.6 billion barrels of untapped oil, with several billion more in reserve.¹¹ Oil, our lifeblood and vital interest, represents a primary US interest around the globe. Should Colombia collapse under the strain of unchecked violence, neighboring Venezuela – which now provides a major percentage of US imported oil – might be at risk due to the potential movement of terrorist groups into the area. The lack of security in the area also inhibits developmental assistance and international investment. This scenario threatens security in the USSOUTHCOM AOR at large, not just in Colombia.

The illegal drug trade, arms trafficking and the terror threat in the Colombian region, paired with the need to involve coalition partners, poses significant intelligence challenges/data sharing problems to the USSOUTHCOM commander. The commander must consider all of these situational factors in the development of planning and the execution of operations for combating drugs, arms trafficking and terrorism.

Analysis

Intelligence Gaps.

USSOUTHCOM's planning team needs to assess, plan and execute operations on very short cycle times in a very demanding battlefield environment and must do so with the best intelligence information possible. The factors of space, time, and force are critical to their operational planning. The Colombian terrain is mountainous and heavily forested while the weather is oppressive with ever-present cloud cover. The terrorist groups know the land, can move very quickly and have become adept with regard to concealment and deception. Timely,

¹¹ State Department Bureau of Western Hemisphere Affairs, "Background Note: Colombia." <http://www.state.gov/r/pa/ei/bgn/1831.htm> [9 April 2003].

accurate intelligence information plays a crucial role in the planning, execution and follow-up of US and coalition operations in Colombia and potentially in the entire Andean Ridge region.

An intelligence gap exists in the lack of assessed and analyzed intelligence information describing the position, character and movement of terrorist groups in Colombia and USSOUTHCOM needs this intelligence information to understand the threat environment, the narco-terrorist movements as well as the status of friendly coalition forces. As the terrorist become more technologically enabled and their capabilities grow stronger, they will move faster, improve their ability to engage in conflict and initiate better denial and deception measures. Key operational planning decisions may well be made using faulty assumptions due to outdated or non-existent information. Timely, actionable intelligence information is critical to stay a “step ahead” of the enemy.

The military will require an adept understanding of the environment and will require information in formats familiar to the forces for training and operational execution purposes. Training is focused on thwarting guerrilla tactics, vetting human rights abuses and protecting national interests such as critical infrastructure assets including oil pipelines.¹² According to General James Hill. “To strengthen capabilities, build coalitions and ensure allies can effectively defeat terror activities, we must provide partner nation security forces with equipment and continue to train with them in bilateral and multilateral exercises.”¹³ USSOUTHCOM is also interested in crop eradication and crop replacement efforts to determine the rate success in that endeavor. Additionally, it is important for them to understand where primary transit points are

¹² Global News Wire, Ibid. 6.

¹³ General James T. Hill, United States Army Commander, United States Southern Command, “Prepared Statement to the U.S. Congress, Senate, Committee of the Armed Services.” *Federal News Service*. 14 March 2003. http://web.lexis-nexis.com/universe/document?_m=f3f7e897e697415db88de30b66841c81&docnum=6.htm, [9 April 19, 2003]. Pg. 6.

located to interdict drug shipments.¹⁴ National Imagery and Mapping Agency (NIMA) will aid the military's understanding of the environment through country specific database information and up to date imagery. They will additionally provide NIMA products like the Topographic Line Map, whose product format is familiar to military forces and planners. Today, gaps exist with regard to current data and imagery to analyze crop status and terrorist positions as well as the availability of current map products.¹⁵

Intelligence information gaps also exist with regard to satisfying the State Department information requirements for influencing negotiations with the narco-terrorists. Intelligence information can document enemy location and activities as well as document actions that indicate adherence to agreements. Embassy officials also require intelligence to monitor economic conditions, security efforts and ensure the sanctity of the democratic state in Colombia.¹⁶

Today, the gaps in current intelligence data represent a clear risk to the planning and execution of operations. Databases from which consistent intelligence information and products can be distributed are required to not only plan and train for exercises, but also to realize execution success. The databases do not exist in a format and level of classification that makes them fully interoperable across all needed parties.

These intelligence information gaps are worsened by outdated and non-existent information, for instance, information about the people, places and things on the earth's surface. USSOUTHCOM is currently working from outdated maps and charts, which significantly

¹⁴ General James T. Hill. Ibid 4.

¹⁵ NIMA Imagery Library and Gateway. Review of current inventory of maps, charts and current imagery of Colombia. <http://www.nima.mil/gateway.htm> [9 April 2003].

¹⁶ Ambassador Marc Grossman, Under Secretary of State for Political Affairs, "Prepared Testimony before the U.S. Congress, House of Representatives, House Appropriations Committee's Sub-committee on Foreign Operations." 10 April 2002. <http://usembassy.state.gov/posts/col/wwwsmg10.shtml> [9 April 2003].

increases risk of making poor assumptions relative to the planning of operations in Colombia.¹⁷ Operations are likely to be planned using outdated and missing information to serve, interdict and deter narco-terrorist attacks, protect critical infrastructures and ultimately destroy terrorist cell bases of operation, drug crops (coca).

Intelligence information provides the critical basis for operational planning in Colombia and the USSOUTHCOM AOR. The intelligence information must be timely, accurately analyzed and actionable. Geospatial Intelligence is a way to mitigate these intelligence information gaps.

Geospatial Intelligence: A Way to Mitigate Intelligence Information Gaps

Intelligence information superiority depends on situational knowledge. The desire for situational awareness makes it critically important to capture a consistent base set of information contained within a “ubiquitous knowledge map.” The Common Operating Picture (COP) enables this superiority by providing common methods to visualize the mission space, and bring added precision to planning, navigation and operations to USSOUTHCOM. The COP enhances interoperability across organizations, missions and systems and serves as the foundation on which spatially referenced intelligence information from other sources (SIGINT, HUMINT, MASINT, etc) can be overlaid. Thus actionable analysis and recommendations can be generated based on trusted, commonly framed information about the earth.

The COP is intended to represent the physical world of the USSOUTHCOM AOR to the most accurate extent possible. This accuracy is important for operational planners in Colombia to understand the spatial relationships of drug crops, features and terrain. Spatially related information in a digital format or medium to provide a common operating picture will allow for

¹⁷ NIMA Imagery Library and Gateway. Review of current inventory of maps, charts and current imagery of Colombia. <http://www.nima.mil/gateway.htm> [9 April 2003].

dynamic updating (as events unfold, data can be readily changed) to meet future challenges.

Spatial information will also provide a level of consistent data that can be used across the domain of coalition partners in the war on terror in Colombia. As terrorist bases of operation change or additional transit points are identified, all consumers will have access to consistent data from one database of information and therein, minimize operational risk. Consistent intelligence information relating to changes in critical infrastructure (oil pipelines), crop eradication status and terrorist bases of operation (and potential bases of operation) captured in a database of information will be a key force multiplier and tool, and will provide a common perspective, to achieve success in planned operations.

*Geospatial Intelligence*¹⁸ (GeoInt) will provide that perspective. GeoInt is a set of descriptive (data that is attributed with descriptive information such as building material, size and shape) layers of information accurately geopositioned to the Earth's surface. One layer is the foundation feature layer. This layer describes the attributes of the features such as buildings, road and rail networks, waterways, vegetation and boundaries. The features can be collected in a dense fashion to have a broadening effect on enhancing USSOUTHCOM planner's battle-space awareness and decision-making ability.

Upon this geospatial framework foundation, additional layers of intelligence information are developed to include imagery analytical intelligence. Imagery analytic intelligence can be described by three basic categories; Descriptive, explanatory and predictive. Descriptive imagery intelligence describes a geographic area, subject or event (i.e.: location of drug crops or processing facilities). Explanatory imagery intelligence usually takes the form of a description

¹⁸ Geospatial Intelligence is defined as the exploitation and analysis of imagery and geospatial information to describe, assess and visually depict physical features and geographically referenced activities on the Earth. It is described as the convergence of imagery analysis and mapping, charting and geodesy into a single integrated discipline with synergistic strengths beyond the sum of its parts.

of an event followed by opinion, which applies a wider context and projects probable cause (i.e.: kind of drug production facility, quantity and frequency of production). It explains why something happened and it's relevance to our national security. Predictive imagery intelligence, which uses pattern analysis, inference and probability techniques, try to predict what will happen (i.e.: terrorist evacuation routes). As USSOUTHCOM analysts formulate targeting opportunities and other operational requirements, they look to this type of speculative analysis to assist the decision making process, a key element to the success of an operation. Layers of intelligence information with respect to projected movement of the terrorists, key points of departure for drug trafficking and areas conducive to hiding processing facilities or the stockpiled drugs can be included in the GeoInt.

The vast data holdings of imagery (controlled to known points on the earth's surface), elevation (terrain data) and feature data, geodetic and geophysical data (accuracy keys to weapon delivery systems), point positioning data (targeting), nautical and safety of navigation data contained in geospatial intelligence will help narrow the space factor gap relative to operations in Colombia.

Critical to the success of operations in Colombia are the geospatial intelligence layers that can be distinguished and separated (all layers do not need to be disseminated) to provide an unclassified context to coalition partners for unprecedented situational awareness. This allows USSOUTHCOM and his coalition partners to understand the context of world events in order to more accurately plan and predict future activities. GeoInt bridges the gap for USSOUTHCOM's requirement for actionable intelligence because it can accept timely updates and is easily disseminated. Operations for confronting terrorists and drug traffickers are more efficient and effective as a result of timely, shared information. Geospatial Intelligence in the future will

employ a web-enabled process to allow users in Washington, Miami or Bogotá to click on any site and instantly learn its geographic location, function and structural attributes.

Geospatial analysts employ visualization tools that use patterns of lines of communication and probability techniques to predict the likelihood of mobile target movement (such as terrorists relocating bases of operation). These predictions assist operational planners in their efforts to identify potential targets.

On 13 February 2003, a U.S. Cessna 208 carrying four U.S. citizens on an intelligence mission over the southern province of Caqueta, Colombia crashed in one of the strongholds of the terrorists.¹⁹ Although security forces were on the scene in thirty minutes, by the time rescue operations arrived all that remained was smoke rising from the wreckage. Two of the bodies were found over one kilometer away from the wreckage, shot at close range in the head and chest.²⁰ The search for the remaining passengers of the aircraft goes on today.

GeoInt could have helped this situation. Upon learning of the crash, rescue operations could have accessed the GeoInt information to quickly determine the precise location of the mishap and possible avenues of escape as well as known terrorist bases of operation. Instead of scouring the landscape looking for the remaining passengers (now identified as kidnapped hostages²¹) with troops and helicopters, the GeoInt could have minimized the search area and potentially helped to secure their safety.

Information Sharing with Coalition partners: A Geospatial Intelligence challenge.

GeoInt must be shared among many operational partners in Colombia. Years ago General Peter Pace, then Combatant Commander of USSOUTHCOM, recognized the requirement to involve coalition and Colombian military partners in operations aimed at drug eradication and thwarting narco-terrorist groups. General Pace pointed out that the intelligence must be shared

¹⁹ “USA Faces Colombian Dilemma,” *Jane’s Intelligence Review*, April 2003 [11 April 2003].

²⁰ *Jane’s Intelligence Review*. Ibid. 1.

²¹ *Jane’s Intelligence Review*. Ibid. 2.

to realize operational success in his Area of Responsibility.²² The requirement to share intelligence continues to exist today. General James Hill, present USSOUTHCOM Commander, has articulated the same sentiment with regard to involving Colombia's neighbors and the importance of sharing intelligence data in his recent testimony to Congress.²³

Operations will require many different consumers from all areas of the elements of national power to include diplomatic, information, military and economic. The consumers of intelligence will range from the U.S. and Colombian military, U.S. government entities, country coalitions from the region, and potentially Non Government Organizations (NGOs). USSOUTHCOM will be cognizant of the activities of each of these consumers and in many cases will coordinate their operations. Intelligence data must, therefore, be of a classification character that can be easily shared.

The War on Terrorism will be addressed not only through the partnership of coalition nations but also through interagency coordination and support. Members of the Joint Interagency Task Force East (JIATF-E) include representatives from the Department of Defense, Department of Treasury, Drug Enforcement Agency, Department of State and the Department of Homeland Security.²⁴ This task force brings various and sundry capabilities that must be shared to effectively coordinate regional counter-terrorism efforts. Embracing operational partners in pursuit of common interests in Colombia and throughout the region is important to the U.S. and will clearly require sharing timely, actionable intelligence.

²² General Peter Pace, United States Marine Corps, United States Southern Command, "Prepared Statement to the U.S. Congress, Senate, Committee of the Armed Services." 27 March 2001.
<http://www.usinfo.state.gov/regional/ar/colombia/030322.htm> [22 March 2003].

²³ General James T. Hill, United States Army Commander, United States Southern Command, "Prepared Statement to the U.S. Congress, Senate, Committee of the Armed Services." *Federal News Service*. 14 March 2003.
http://web.lexis-nexis.com/universe/document?_m=f3f7e897e697415db88de30b66841c81&docnum=6.htm, [9 April 19, 2003]. Pg. 6.

²⁴ Ibid. 5.

Each consumer of intelligence will plan activities or operations relative to the intent of the foreign aid provided by the U.S. government and the end state desired in Colombia. Per General Hill's recent testimony, "to effectively prosecute the war on terrorism we must work with and assist partner nations to interdict illicit activities that support terrorist throughout our AOR."²⁵

Each of the aforementioned consumers of intelligence data has varying requirements for information relative to operations. As military operations are planned, USSOUTHCOM will work in concert with US State Department diplomatic efforts. State Department officials are often called upon to provide increased intelligence in support of the peace process.²⁶ Intelligence information can document enemy location and activities as well as document adherence to agreements. Terrorist assaults on the sanctity and security of Colombia's democracy have come in the form of murdering legislators, kidnapping presidential candidates and interference in national elections.²⁷ Embassy officials will require intelligence to monitor economic conditions and security efforts and to ensure the sanctity and security of the democratic state in Colombia.

Interdicting illicit drug problems in Colombia will require USSOUTHCOM's to plan operations in concert with the Drug Enforcement Agency, Department of the Treasury and the Department of Homeland Defense. These agencies are interested in crop eradication and crop replacement efforts and understanding where primary transit points are located in order to interdict drug shipments. This intelligence will be used to develop metrics that will help determine the rate of success in combating illegal drug production and sales. Determining this

²⁵ Ibid. 2.

²⁶ Ambassador Marc Grossman, Under Secretary of State for Political Affairs, "Prepared Testimony before the U.S. Congress, House of Representatives, House Appropriations Committee's Sub-committee on Foreign Operations." 10 April 2002. <http://usembassy.state.gov/posts/col/wwwsmg10.shtml> [9 April 2003]. Ibid. Pg. 4.

²⁷ Ibid. 4.

information cannot be done unless all parties use the same accuracy and currency level of sharable intelligence.

A secure environment free from the threat of terror for the activities of Non-Government Organizations (NGO) involved in humanitarian efforts in any post conflict phase of operations is another consideration to operational planning for USSOUTHCOM. The NGOs will request intelligence information to support their activities as well. As illegal drug crops are eradicated, displaced farmers will require support rebuilding their lives. Geospatially oriented intelligence information that can be separated into layers and shared will be required to monitor and assist these kinds of developments.

Each consumer of intelligence information requires different layers of data to meet their individual intelligence requirements. Much of the intelligence information available to the USSOUTHCOM today cannot be shared due to its classification. Providing intelligence information that can be shared is paramount to the accomplishment of building coalitions to ensure US allies can effectively address the drug problem, arms trafficking and to deter and dismantle the terrorist organizations in Colombia. Sharing timely, actionable intelligence information is a top operational readiness challenge for USSOUTHCOM in the Area of Responsibility and a key element to the success of counter-terrorism efforts in Colombia.

Commercial Satellite Imagery: A Way to Mitigate Information Sharing Challenge

The commercial satellite imagery asset provides the perfect augmentation to US government produced imagery primarily due to its unclassified nature. Availability of commercial imagery also mitigates competition problems for imagery between users of US government satellites.

This augmentation will help to overcome collection priority issues in Colombia. Collection of commercial satellite imagery was made possible when then President Clinton issued

Presidential Decision Directive 23 (PDD-23) on 10 March 1994. This directive gave U.S. companies permission to acquire and market high-resolution satellite imagery; previously a market cornered by US government-owned and operated satellites.²⁸ Currently, there are three U.S. firms that provide high-resolution imagery data for a broad range of commercial and government customers, Space Imaging, DigitalGlobe and OrbImage. The commercial satellite imagery industry is not wholly U.S based. Foreign commercial imagery assets are also available for exploitation by operational planners in USSOUTHCOM. Foreign commercial interests include SPOTImage (France), IRS (India), RADARSAT (Canada), ALOS (Japan), CBERS (China/Brazil) and EROS (Israel).²⁹

There are four types of imagery available on the commercial market: panchromatic, multi-spectral, hyper-spectral and radar imaging.³⁰ Resolution of the images is key to operational exploitation of the data, especially in Colombia. The resolution of commercial satellite imagery has greatly improved over the years. Today, the resolution of available commercial panchromatic imagery is accurate to 0.5 meter; multi-spectral image resolution is 4 meters.³¹ Currently, commercial radar imagery is not available at a resolution required for military and

²⁸ Mark Hewish, "Military Takes a Giant Leap with Commercial Space Technology", *Jane's International Defense Review*, April 1999, Pg. 46.

²⁹ Dennis M. Miller and John E. Stocker III, *Commercialization of Space Systems: Policy Implications for the United States*, (Newport, RI: Naval War College, June 2000-2001, #1), Pg. 25.

³⁰ **Panchromatic:** Black and white images observed in the visual part of the light spectrum. These images are typically used identifying objects requiring high levels of spatial resolution.

Multi-spectral: Images created using light from various parts of the electro-magnetic spectrum (ultra-violet, visible and infrared) Images highlight spectral differences among surface features and can identify composition signatures.

Hyper-spectral: Imaging creates a large number of images from contiguous, rather than disjointed regions of the spectrum with much finer resolution. The level of hyper-spectral information provides detailed data used specifically for identifying natural features, distinguishing camouflage, detecting chemical and biological weapons and assessing bomb damage of underground structures.

Radar imaging: Active imaging system that beams pulses of electro-magnetic radiation in the microwave spectrum against objects and then records their return signal to generate a final radar image. Radar imaging can be used regardless of weather, cloud cover or nighttime.

³¹ "Commercial Imagery Vendor Facts," National Imagery and Mapping Agency, 2002.

intelligence applications requiring high resolution, however it can certainly be used to fill gaps where no data exists.

Commercial satellite imagery is an important element of GeoInt information. Data extracted from this media is unclassified and is therefore easily shared. The images can be exploited to support a variety of analytical information needs, such as finding and characterizing drug crop stockpiles indicating disposal or pending construction of drug production sites, determining where processing facilities are located, what kind of facility it is, the quantity of production and frequency of production.

Commercial imagery is timely and can contribute to the requirement for actionable, sharable intelligence. Commercial satellites are orbiting the earth revisiting the same spot every one to twenty-six days, depending on the altitude of the vehicle.³² Terrorist movements or movement of mobile or tactical assets requires a series of images over time for superior intelligence analysis. Fly-throughs or three-dimensional imagery products that allow the war fighter to simulate “flying” the operational battle-space can also be developed from commercial imagery. These kinds of products can be shared and are critical to successful operational planning and execution.

Employing commercial imagery assets to produce products that add value to a planner’s situational awareness can significantly narrow the (current) intelligence information gap identified in this AOR. Most importantly, this data is unclassified; it can be developed into imagery-derived products and can be shared among coalition partners.

Commercial Imagery Risks and Mitigation

³² TEC Imagery Office (TIO), Topographic Engineering Center, <http://www.tec.army.mil/tio/index.html> [16 April 2003]

There are risk associated with the use of commercial imagery and geospatial intelligence to fill the intelligence information gaps of the Joint Commander of USSOUTHCOM. These risks are in the form of availability, ability to exploit and dissemination of the data.

Availability: A commercial imagery issue.³³ Commercial high-resolution satellite imagery is available to both deployed military assets and their enemies...at a cost. With the appropriate amount of funding, anyone can purchase and download commercial satellite imagery. The imagery is certainly affordable by terrorists funded by drug-trafficking and other illicit activities.

Availability of commercial imagery can be controlled, to a degree, through negotiation. Negotiation can be accomplished by interdicting or degrading collection, transmission, processing and dissemination of the commercial satellite imagery.³⁴ This can be accomplished through methods that include directed energy weapons (principally lasers), nuclear radiation and kinetic energy anti-satellite weapons directed to foul data collection and transmission.³⁵ These methods are hypothetically effective and have been demonstrated by experiment.³⁶

Exploitation: One must question the terrorist's ability to exploit (evaluate, interpret, analyze) the overhead imagery. The media and others who are inexperienced in imagery exploitation have made major mistakes interpreting images and misidentifying objects in the past, including the number of reactors on fire at Chernobyl in 1986 and the location of the Indian nuclear test sites.³⁷

Dissemination: Dissemination is the process of getting the right information to the right place at the right time. It involves the decisions of what goes where and the logical process of

³³ Kathy Buono, "Glass Houses: Mitigating the Risk of Global Transparency of Commercial Satellite Imagery," Unpublished Research Paper, U.S. Naval war College, Newport, RI: 2002.

³⁴ Ibid 6.

³⁵ Maj. Anthony J. Russo, *The Operational Denial of Commercial Space Imagery* (Fort Leavenworth, KS, U.S. Army Command and General Staff College, 7 June 1996) pp. 49-69.

³⁶ Ibid. 49-69.

getting it to where it needs to be. The ability to control the collection and dissemination of commercial satellite imagery also exists. This control is principally applied to U.S domestic commercial satellites when necessary. “Shutter control”³⁸ is the primary means for the U.S. to control collection and dissemination of commercial images.

Another method to control collection and dissemination of commercial imagery is to “buy-up” the supply of imagery. In an effort to ensure no one had access to commercial imagery prior to and during the initial phase of Operation Enduring Freedom in Afghanistan, NIMA purchased the exclusive rights to all Ikonos commercial satellite data (Space Imaging Corp.) collected during that period.³⁹

Today’s dissemination challenges also revolve around the capacities of communication “pipes” to handle digital information. Current DoD policy assigns primary communications responsibility to the Defense Information Services Agency (DISA). DISA has challenges with respect to an inadequate architecture to handle the data file size of NIMA customer image requests; requirements may not be satisfied in a timely manner. Dissemination of Geospatial Intelligence is a risk until the size of communication pipes is increased. Geospatial intelligence is typically so voluminous (data-rich) that most communication pipes cannot handle the flow of information. Some of the layers of information by themselves are difficult to push through the pipes and difficult for the end-user to pull and process.

³⁷ Ann M. Florini and Yahya Dehqanzada, “Commercial Satellite Imagery Comes of Age,” *Issues in Science and Technology Online*, Fall 1999, p.2, <http://www.nap.edu/issues/16.1/florini.htm> , [16 April 2003].

³⁸ Shutter Control: NOAA licenses for commercial remote-sensing satellites contain the provision, “During periods when national security or international obligations and/or foreign policies may be compromised, as defined by the secretary of defense or the secretary of state, respectively, the secretary of commerce may, after consultation with the appropriate agency (ies), require the licensee to limit data collection and/or distribution by the system to the extent necessitated by the given situation.

³⁹ Robert K. Ackerman, “Afghanistan Imagery Reveals Snapshot of Future Challenges,” *Signal Magazine*, February 2002, p. 2. <http://164.214.2.59/pa/newsroom/nimainnews/signal/signal0202.html> , [16 April 2003].

NIMA has instituted workarounds, however, until such time the communication pipes are sufficient for near-real time dissemination. One of the workarounds is the utilization of a Mobile Integrated Geospatial Intelligence System (MIGS), a system that goes wherever the customer goes. This system revolutionizes the way geospatial intelligence is provided to the Joint Commander. MIGS integrates geospatial intelligence production systems with deployable satellite communications via DISA communications pipes to take the intelligence information on the same maneuver as the force,⁴⁰ thus negating the need to push and pull the information through communication pipes. The disadvantage is inherent in the transit time it takes to get MIGS into theater.

Remote Replication Systems (RRS), a standard suite of equipment to include plotters, laptops loaded with GeoInt information is another mitigation strategy. With RRS's the data are sent forward on CDs or DVDs with the system. The downside is having to reship data when new, more current intelligence information is identified. The upside is having it at all at the joint commander's disposal.

Conclusion:

USSOUTHCOM faces a tremendous challenge fighting the threat of terrorism in Colombia. The enemy is well funded and growing in capability. Drug trafficking, arms purchases and distribution of cocaine continue, as does the terror threat to US interests and its citizens. The pursuit of operations of mutual interest to nations of the region will require intelligence information interoperability among forces and allies. Today, significant gaps exist in the intelligence information available to USSOUTHCOM.

⁴⁰ Brig. General Michael G. Lee, "Transformation Efforts Draw Front Line Approval," *NIMA Pathfinder*, January/February, 2003. Pp 6-7.

Current gaps in timely intelligence information can be mitigated through the development of geospatial intelligence with expanded use of commercial satellite imagery assets. Commercial imagery is a way to meet objectives of more, timely, and current geospatial intelligence. This intelligence information will enable a situational awareness of the battlefield environment previously unknown to the USSOUTHCOM joint commander and can be provided in an unclassified venue when required for sharing between coalition partners. Sharing intelligence data is important to the success of the USSOUTHCOM operational endeavor. Geospatial Intelligence can help in that regard.

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